ISO

ORDER NO. RD-634

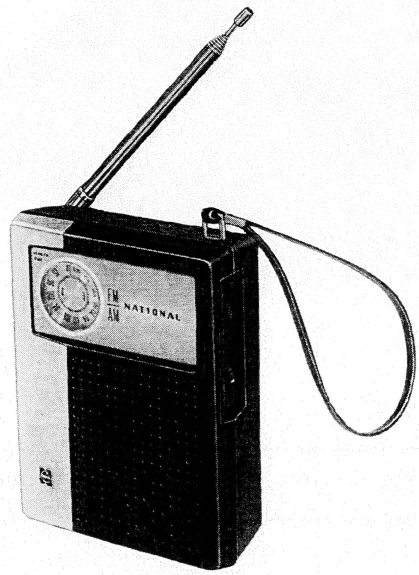
National

NATIONAL PANASONIC

Service Manual

FM-AM PORTABLE RADIO

MODEL RF-619



SPECIFICATIONS

Frequency Range:	FM 87~108 MHz AM 525~1605 kHz (571~187m)
Intermediate Frequency:	FM 10.7 MHz AM 455 kHz
Transistors:	2SC920 FM RF Amplifier 2SC920 FM Converter 2SC920 FM 1st IF Amp. & AM Converter 2SC829 FM 2nd IF Amp. & AM 1st IF Amp. 2SC829 FM 3rd IF Amp. & AM 2nd IF Amp. 2SB173/2SB111 1st AF Amplifier 2SB171/2SB111 2nd AF Amplifier 2SB176/2SB117 } Power Amplifier (push-pull) 2SB176/2SB117 }
Diodes:	OA90/1N34A } FM Detector OA90/1N34A } OA90/1N34A AM Detector & AGC OA90/1N34A FM D. AGC
Sensitivity:	FM 5μV for 50mW Output AM 100μV/m for 50mW Output
Power Output:	250mW Maximum
Battery:	9V Battery (NATIONAL 006P or equivalent)
Speaker:	6cm (2¼") PM Dynamic Speaker, Imp. 8Ω
Cabinet Dimensions:	85 (Wide) × 115 (High) × 38 (Deep) mm (3 11/32" × 4 17/32" × 1 1/2")
Weight:	320g. (11 1/2 oz.) without battery

<EXPORT DIVISION>
MATSUSHITA ELECTRIC TRADING CO., LTD.
P. O. Box 288, Central Osaka, Japan

MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.
RADIO and STEREO DIVISION

To Remove Chassis (Refer to Fig. 1)

1. Remove cabinet back cover.
2. Press spring in the direction of an arrow as illustrated in Fig. 1 and lift chassis.
3. To remove chassis completely, unsolder leadwires to speaker & P.C. board terminal.
4. To reassemble, reverse the above procedure.

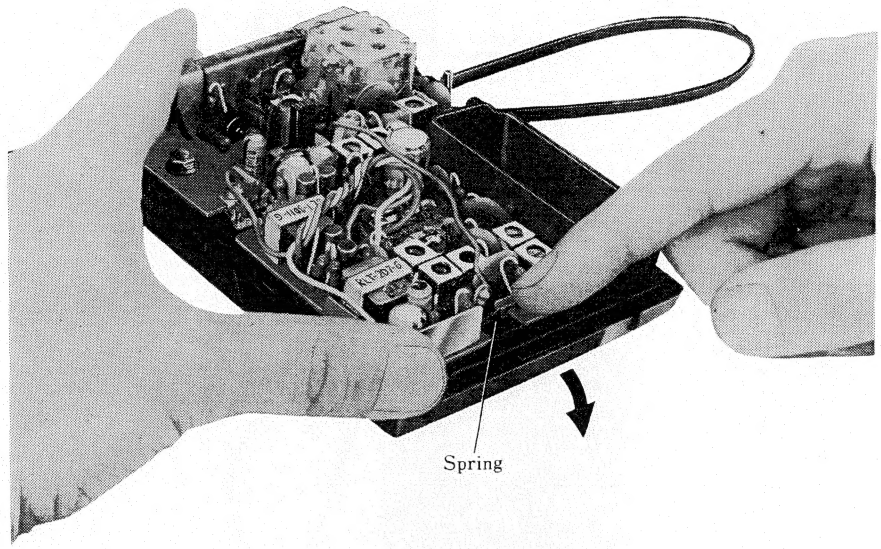
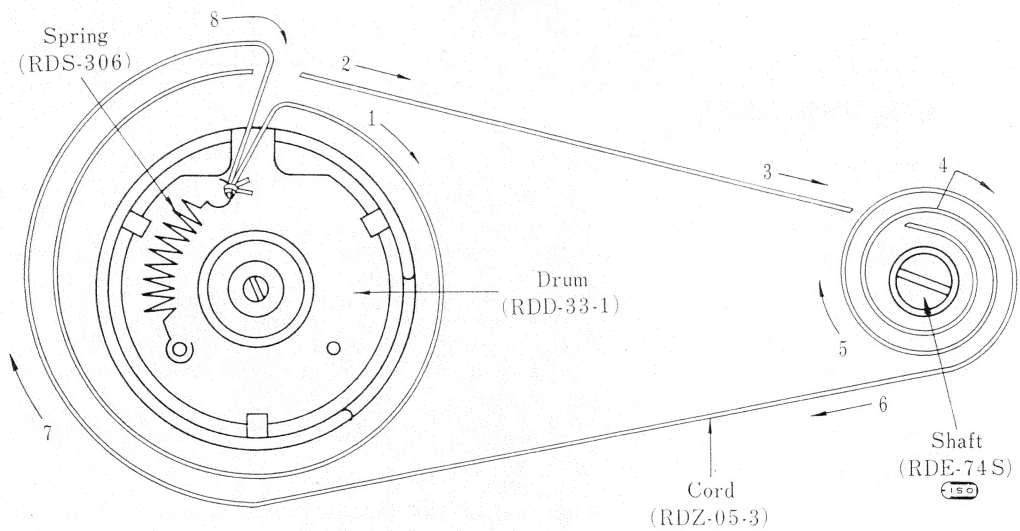


Fig. 1 Top View—Disassembly Points



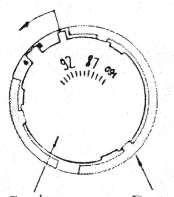


Fig. A

Notes :

1. Dial cord length is 50cm (20″).
2. Remove dial scale in the direction of an arrow as illustrated in Fig. A.
3. Tuning gang is positioned at maximum capacity.
4. Arrow marks (1~8) indicate correct order and direction of stringing dial cord.
5. Cement dial cord ends.

Fig. 2 Dial Cord Stringing Guide

ALIGNMENT INSTRUCTIONS

AM IF & RF ALIGNMENT

Output of signal generator should be no higher than necessary to obtain an output reading.
Set volume control to maximum.
Set band selector switch to AM.
Set power source voltage to 9 volts DC.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUSTMENT	REMARKS
1	Fashion loop of several turns of wire and radiate signal into loop of receiver.	455 kHz (1000∿ Mod.)	Point of non-interference (on/about 600 kHz)	Output meter across earphone jack (Load 8Ω)	T_2 (1st IFT) T_4 (2nd IFT) T_8 (3rd IFT)	Adjust for maximum output.
2	〃	520 kHz (1000∿ Mod.)	Tuning gang fully closed	〃	L_9 (OSC Coil)	〃
3	〃	1650 kHz (1000∿ Mod.)	Tuning gang fully open.	〃	C_{23} (OSC Trimmer)	〃
4	〃	550 kHz (1000∿ Mod.)	Tune to signal	〃	L_8 (ANT Coil)	Adjust for maximum output by sliding coil (L_8) along ferrite core.
5	〃	1500 kHz (1000∿ Mod.)	Tune to signal	〃	C_{18} (ANT Trimmer)	Adjust for maximum output. Repeat steps 2 through 5.

Note: Cement antenna bobbin with wax after completing alignment.

FM IF & DETECTOR ALIGNMENT WITH OSCILLOSCOPE

OSCILLOSCOPE

Set sweep selector of oscilloscope to "External Sweep". Apply 60 Hz sweep signal from sweep generator to horizontal input terminals of oscilloscope.

EQUIPMENT REQUIRED

Signal generator that provides 10.7 MHz marker.
Sweep generator that provides 10.7 MHz center frequency and 400 kHz sweep width.
Set band selector switch to FM.
Set volume control to minimum.
Set power source voltage to 9 volts DC.

Note: When step 1 alignment, unsolder lead between test point **TP3** and point Ⓐ before alignment and resolder it after alignment.

	SWEEP GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUSTMENT	REMARKS
1	High side thru. .001μF to point **TP2**. Common to point **TP5**.	High side thru. .001μF to point **TP2**. Common to point **TP5**.	Point of non-interference. (on/about 90 MHz).	Connect vert. Amp. of scope to point **TP3**. Common to point **TP5**.	T_1 (FM 1st IFT) T_3 (FM 2nd IFT) T_5 (FM 3rd IFT) T_6 (FM 4th IFT) (Primary)	Adjust for maximum amplitude and proper linearity between ±100 kHz markers. (Refer to Fig. 3)
2	〃	〃	〃	Connect vert. Amp. of scope to point **TP4**. Common to point **TP5**.	T_7 (FM 4th IFT) (Secondary)	Adjust **T7** so that 10.7 MHz marker appears the center. (Refer to Fig. 4)

Note: When aligning the Ratio Detector circuit, the wave form may appear as in Figs. 3 & 4 or upside-down.

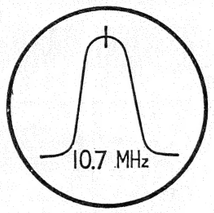


Fig. 3

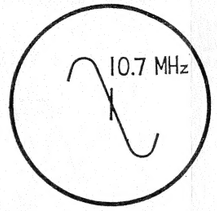


Fig. 4

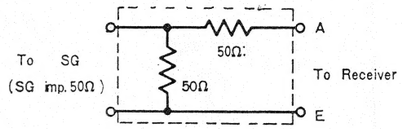


Fig. 5 FM Dummy Antenna

FM RF ALIGNMENT

Output of signal generator should be no higher than necessary to obtain an output reading.
Set volume control to maximum.
Set band selector switch to FM.
Set power source voltage to 9 volts DC.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUSTMENT	REMARKS
1	Connect test point to **TP1** through FM Dummy antenna. Common to point **TP5**. (Refer to Fig. 6)	85.5 MHz (1000∿ Mod.)	Tuning gang fully closed.	Output meter across earphone jack. (Load 8Ω)	L_7 (FM OSC Coil)	Adjust for maximum output.
2	〃	109.5 MHz (1000∿ Mod.)	Tuning gang fully open.	〃	C_{14} (FM OSC Trimmer)	〃
3	〃	90 MHz (1000∿ Mod.)	Tune to signal	〃	L_5 (FM Collector Trimmer)	〃
4	〃	106 MHz (1000∿ Mod.)	Tune to signal	〃	C_6 (FM Collector Trimmer)	Adjust for maximum output. Repeat steps 1 through 4.

Note: As three output responses will be present, proper tuning is the center frequency.

Cabinet (Complete) RYA-4381

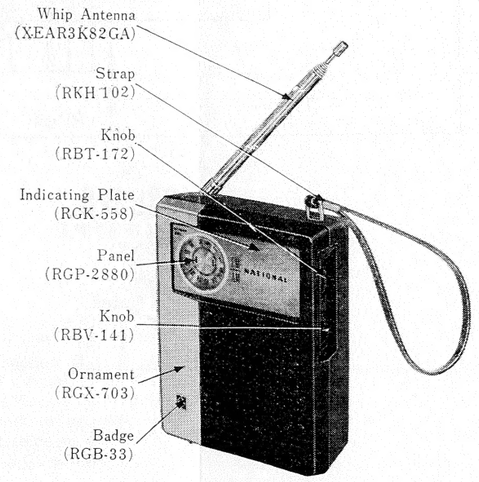
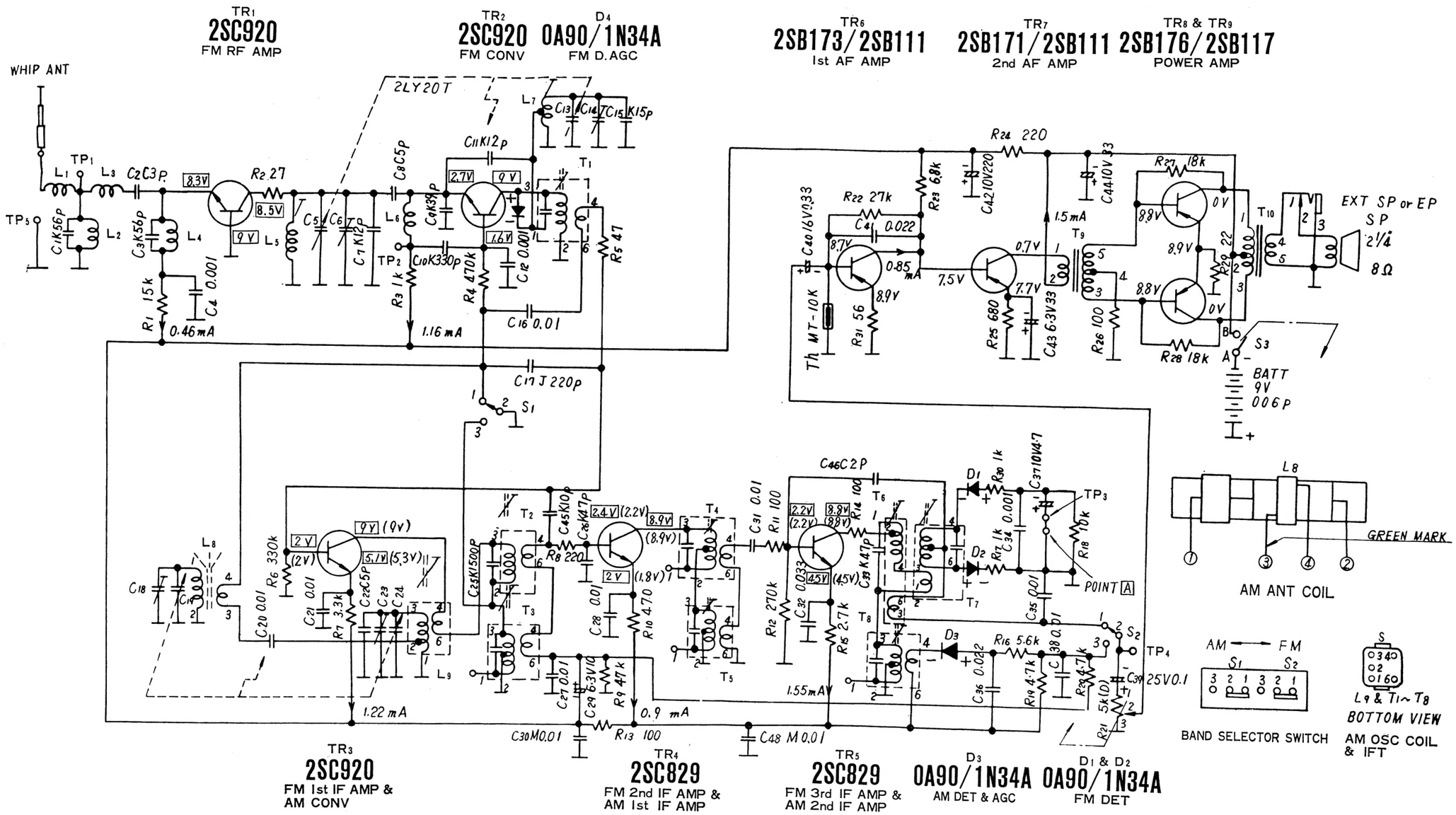


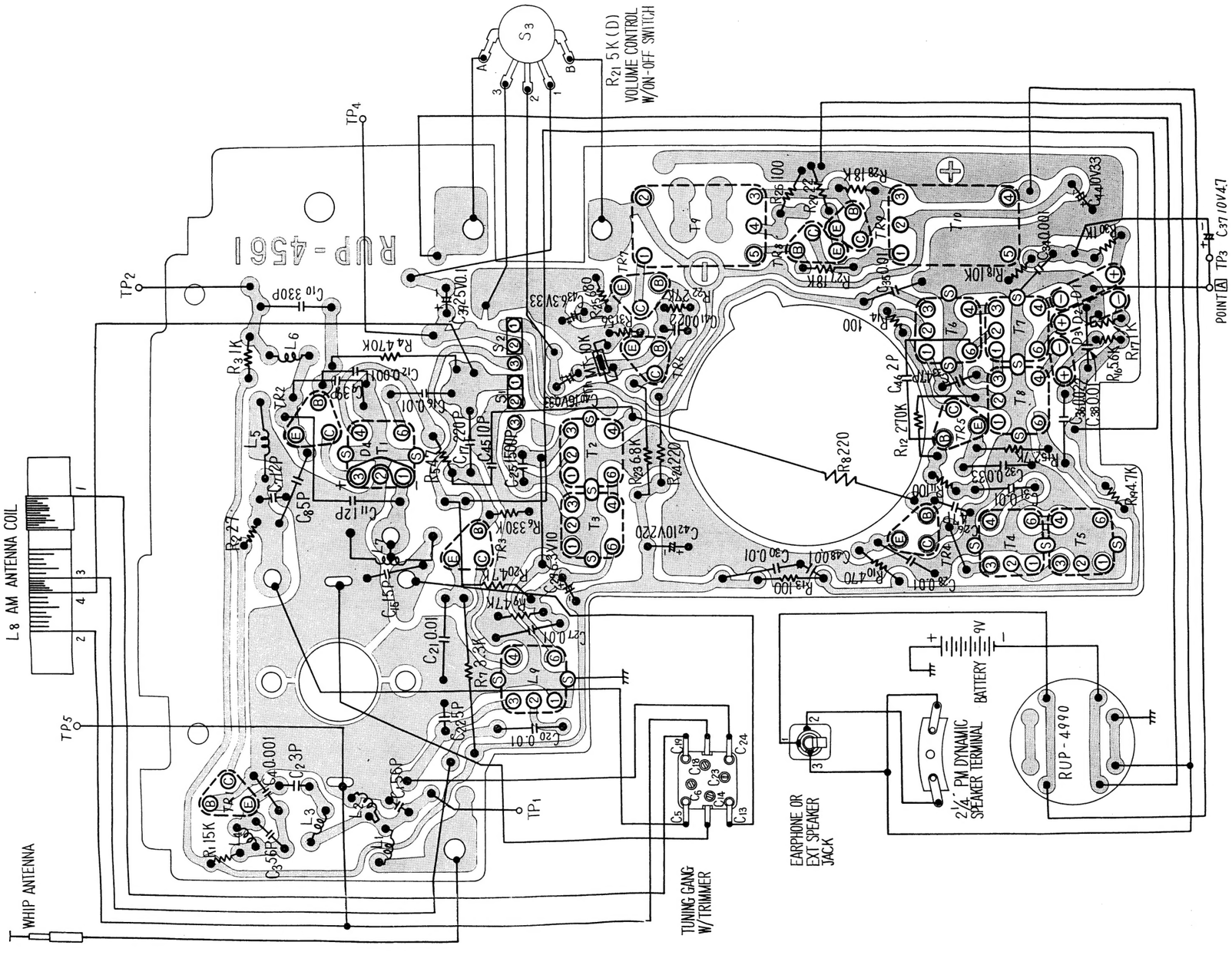
Fig. 6 Cabinet & Appearance—Parts Identification



Notes :

1. S1~S2 : Band selector switch in "FM" position.
2. S3 : Power source switch in "OFF" position.
3. DC voltages measurements are taken with circuit tester (10KΩ/V) from negative terminal of battery.
   □.....FM position ( ).....AM position.
4. Capital letters (M, K, J, C) in the circuit diagram show allowable tolerances of resistors and capacitors as follows:
   M=±20% K=±10% J=±5% C=±0.25PF
   Tolerance of resistor is ±10% (K) if not otherwise indicated.
   Tolerance of capacitor is +100% (P) if not otherwise indicated. − 0%
5. PF=pico farad=mmf
   μF=micro farad=mfd
6. Battery current : No signal.....FM & AM 12mA
   Maximum output...FM & AM 52mA
7. All resistor values in ohms (K=1000Ω).
8. All capacitor values in micro farads (P=mmf).

Fig. 7 Schematic Diagram



Notes:

1. All resistor values in ohms (K=1000Ω).
2. All capacitor values in micro farads (P=mmf).

Fig. 8 Circuit Board Wiring View (Conductor Side)

Capacitors, Transformers, Coils & Trimmers

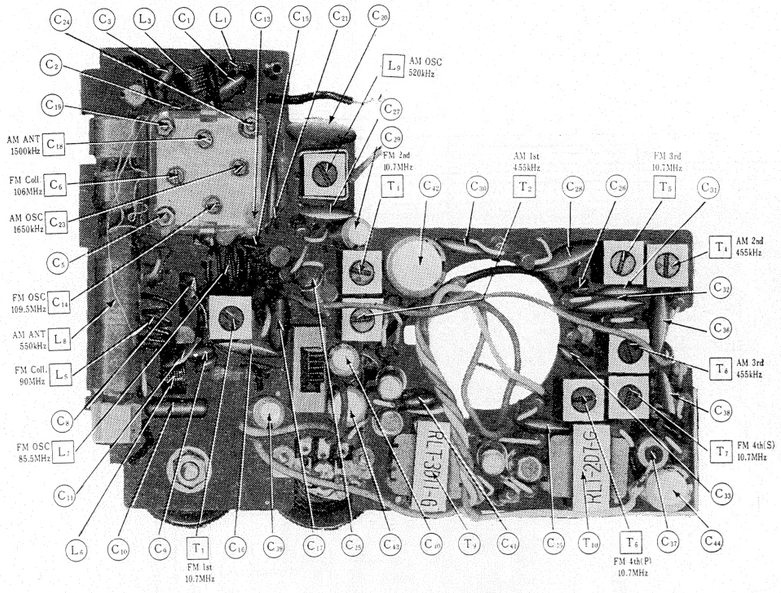


Fig. 9 Component View—Parts Identification, Alignment Points

Resistors, Transistors, Diodes & Thermistor

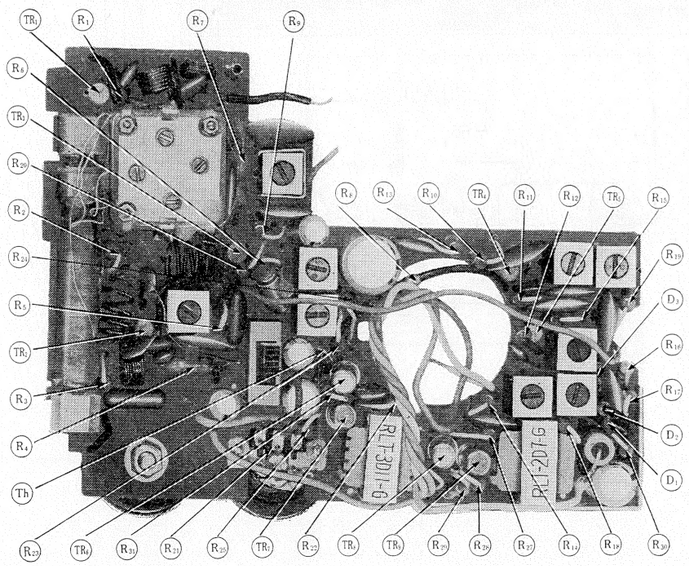


Fig. 10 Component View—Parts Identification

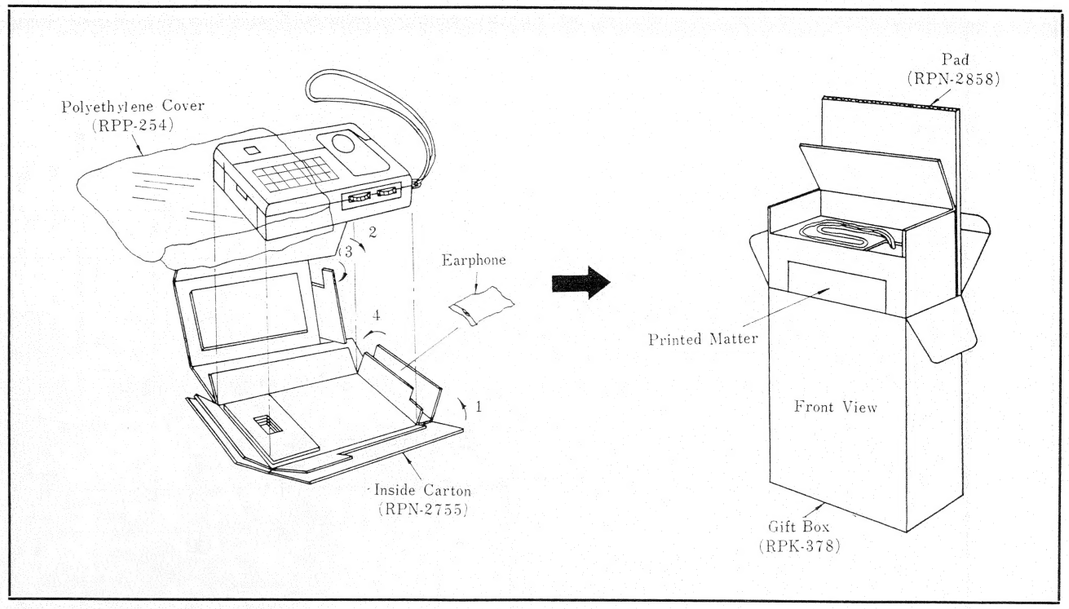


Fig. 11 Component Packing

ISO

REPLACEMENT PARTS LIST

Notes: 1. ※ indicates parts for the complete cabinet which are included when the cabinet is ordered.
2. Part numbers are indicated on most mechanical parts. Please use this number, therefore, when ordering parts.
3. ISO metric thread screws & parts which employ ISO metric thread screws are identified by ISO marking.

Ref. No.	Part No.	Description
		TRANSISTORS AND DIODES
TR_1	2SC920	FM RF Amplifier
TR_2	2SC920	FM Converter
TR_3	2SC920	FM 1st IF Amp. & AM Converter
TR_4	2SC829	FM 2nd IF Amp. & AM 1st IF Amp.
TR_5	2SC829	FM 3rd IF Amp. & AM 2nd IF Amp.
TR_6	2SB173 or 2SB111	1st AF Amplifier
TR_7	2SB171 or 2SB111	2nd AF Amplifier
TR_8	2SB176 or 2SB117	Power Amplifier (push-pull)
TR_9	2SB176 or 2SB117	
D_1	OA90 or 1N34A	FM Ratio Detector
D_2	OA90 or 1N34A	
D_3	OA90 or 1N34A	AM Detector & AGC
D_4	OA90 or 1N34A	FM D. AGC
		THERMISTOR
Th	MT-10K	Temperature Compensator
		CAPACITORS
C_1	ECM-S05560K-H	56PF, 50WV, ±10%, Mica
C_2	ECC-D05030C	3PF, 50WV, ±0.25PF, Ceramic
C_3	ECM-S05560K-H	56PF, 50WV, ±10%, Mica
C_4	ECK-D05102P	0.001μF, 50WV, +100%, − 0%, Ceramic
C_5, C_{13}, C_{19}, C_{24},	PVC-2LY20T	Tuning Gang, w/Trimmer (C_6, C_{14}, C_{18}, C_{23})

Ref. No.	Part No.	Description
		CAPACITORS
C_7	ECC-D05120KC	12PF, 50WV, ±10%, Ceramic
C_8	ECC-D05050CC	5PF, 50WV, ±0.25PF, Ceramic
C_9	ECC-D05390K	39PF, 50WV, ±10%, Ceramic
C_{10}	ECC-D05331K	330PF, 50WV, ±10%, Ceramic
C_{11}	ECC-D05120KC	12PF, 50WV, ±10%, Ceramic
C_{12}	ECK-D05102P	0.001μF, 50WV, +100%, − 0%, Ceramic
C_{15}	ECC-D05150KC	15PF, 50WV, ±10%, Ceramic
C_{16}	ECK-E05103MY	0.01μF, 50WV, ±20%, Ceramic
C_{17}	ECM-S05221J-H	220PF, 50WV, ± 5%, Mica
C_{20}	ECK-E05103MY	0.01μF, 50WV, ±20%, Ceramic
C_{21}	ECK-E05103MY	0.01μF, 50WV, ±20%, Ceramic
C_{22}	ECC-D05050CC	5PF, 50WV, ±0.25PF, Ceramic
C_{25}	ECQ-S02152KZ	1500PF, 25WV, ±10%, Styrol
C_{26}	ECM-S05470K-H	47PF, 50WV, ±10%, Mica
C_{27}	ECK-E05103P	0.01μF, 50WV, +100%, − 0%, Ceramic
C_{28}	ECK-E05103MY	0.01μF, 50WV, ±20%, Ceramic
C_{29}	ECE-A6V10	10μF, 6.3WV, Electrolytic
C_{30}	ECK-E05103MY	0.01μF, 50WV, ±20%, Ceramic
C_{31}	ECK-E05103P	0.01μF, 50WV, +100%, − 0%, Ceramic
C_{32}	ECK-E05333P	0.033μF, 50WV, +100%, − 0%, Ceramic
C_{33}	ECM-S05470K-H	47PF, 50WV, ±10%, Mica
C_{34}	ECK-D05102P	0.001μF, 50WV, +100%, − 0%, Ceramic
C_{35}	ECK-E05103P	0.01μF, 50WV, +100%, − 0%, Ceramic
C_{36}	ECK-E05223P	0.022μF, 50WV, +100%, − 0%, Ceramic
C_{37}	ECE-B10V4R7	4.7μF, 10WV, Electrolytic
C_{38}	ECK-E05103P	0.01μF, 50WV, +100%, − 0%, Ceramic
C_{39}	ECA-F25VR1	0.1μF, 25WV, Electrolytic
C_{40}	ECA-G16ER33	0.33μF, 16WV, Electrolytic
C_{41}	ECQ-G05223MZ-N	0.022μF, 50WV, ±20%, Polyester
C_{42}	ECE-A10V220	220μF, 10WV, Electrolytic
C_{43}	ECE-A6V33	33μF, 6.3WV, Electrolytic
C_{44}	ECE-A10V33	33μF, 10WV, Electrolytic
C_{45}	ECC-D05100KC	10PF, 50WV, ±10%, Ceramic
C_{46}	ECC-D05020C	2PF, 50WV, ±0.25PF, Ceramic
C_{48}	ECK-E05103MY	0.01μF, 50WV, ±20%, Ceramic
		RESISTORS
R_1	ERD-14TK 153	15KΩ, ¼Watt, ±10%, Carbon
R_2	ERD-14VK 270	27Ω, ¼Watt, ±10%, Carbon
R_3	ERD-14VK 102	1KΩ, ¼Watt, ±10%, Carbon
R_4	ERD-14TK 474	470KΩ, ¼Watt, ±10%, Carbon
R_5	ERD-14VK 470	47Ω, ¼Watt, ±10%, Carbon
R_6	ERD-14VK 334	330KΩ, ¼Watt, ±10%, Carbon
R_7	ERD-14TK 332	3.3KΩ, ¼Watt, ±10%, Carbon
R_8	ERD-14TK 221	220Ω, ¼Watt, ±10%, Carbon
R_9	ERD-14VK 473	47KΩ, ¼Watt, ±10%, Carbon
R_{10}	ERD-14VK 471	470Ω, ¼Watt, ±10%, Carbon
R_{11}	ERD-14VK 101	100Ω, ¼Watt, ±10%, Carbon
R_{12}	ERD-14TK 274	270KΩ, ¼Watt, ±10%, Carbon
R_{13}	ERD-14VK 101	100Ω, ¼Watt, ±10%, Carbon
R_{14}	ERD-14VK 101	100Ω, ¼Watt, ±10%, Carbon
R_{15}	ERD-14VK 272	2.7KΩ, ¼Watt, ±10%, Carbon
R_{16}	ERD-14VK 562	5.6KΩ, ¼Watt, ±10%, Carbon
R_{17}	ERD-14VK 102	1KΩ, ¼Watt, ±10%, Carbon
R_{18}	ERD-14VK 103	10KΩ, ¼Watt, ±10%, Carbon
R_{19}	ERD-14VK 472	4.7KΩ, ¼Watt, ±10%, Carbon
R_{20}	ERD-14VK 472	4.7KΩ, ¼Watt, ±10%, Carbon
R_{21}	EVL-A2BT10D53	5KΩ(D), Volume Control, w/ON-OFF Switch (S_3)
R_{22}	ERD-14VK 273	27KΩ, ¼Watt, ±10%, Carbon
R_{23}	ERD-14VK 682	6.8KΩ, ¼Watt, ±10%, Carbon

MODEL RF-619

Ref. No.	Part No.	Description
		RESISTORS
R24	ERD-14VK 221	220Ω, ¼Watt, ±10%, Carbon
R25	ERD-14TK 681	680Ω, ¼Watt, ±10%, Carbon
R26	ERD-14VK 101	100Ω, ¼Watt, ±10%, Carbon
R27	ERD-14VK 183	18KΩ, ¼Watt, ±10%, Carbon
R28	ERD-14VK 183	18KΩ, ¼Watt, ±10%, Carbon
R29	ERD-14VK 220	22Ω, ¼Watt, ±10%, Carbon
R30	ERD-14VK 102	1KΩ, ¼Watt, ±10%, Carbon
R31	ERD-14VK 560	56Ω, ¼Watt, ±10%, Carbon
		COILS AND TRANSFORMERS
L1	RLQ-Y25S-5	FM Choke Coil
L2	RLQ-Y10S-5	FM Choke Coil
L3	RLQ-Y75S-5	FM Choke Coil
L4	RLQ-Y10S-5	FM Choke Coil
L5	RLD-4Y45	FM Collector Coil
L6	RLQ-Y75S-5	FM Choke Coil
L7	RLO-4Y44	FM Oscillator Coil
L8	RLF-2I30-O	AM Antenna Coil
L9	RLO-2B48-M	AM Oscillator Coil
T1	RLI-4B152-M	FM 1st IF Transformer
T2	RLI-2B152-M	AM 1st IF Transformer
T3	RLI-4B351-M	FM 2nd IF Transformer
T4	RLI-2B157-M	AM 2nd IF Transformer
T5	RLI-4B351-M	FM 3rd IF Transformer
T6	RLI-4B551-M	FM 4th IF Transformer, Primary
T7	RLI-4B552-M	FM 4th IF Transformer, Secondary
T8	RLI-2B457-M	AM 3rd IF Transformer
T9	RLT-3D11-G	Input Transformer, P=8KΩ : S=4KΩ
T10	RLT-2D7-G	Output Transformer, P=600Ω : S=8Ω
		SPEAKER AND EARPHONE
SP	EAS-6P75SG	6cm (2¼″) PM Dynamic Speaker, 8Ω
EP	EAE-1FB	Magnetic Earphone, 8Ω
		SWITCH
S1, S2	RSS-139	Band Selector Switch
		MISCELLANEOUS
	RJJ-61	Jack, Earphone & EXT Speaker
	※RUS-163	Spring, Chassis M'tg.
	RUL-408	Bracket, Strap M'tg.
	RMS-54	Bracket, Speaker M'tg. (2 req'd)
	RMA-266	Bracket, Core Antenna M'tg. (2 req'd)
	RDS-306	Spring, Dial
	RDZ-05-3	Cord, Dial, 50cm (20″)
	RDE-74S	Shaft, Tuning ISO
	NN-3S	Nut, Tuning Shaft M'tg. ISO
	RDD-33-1	Drum, Dial
	※RJK-9101	Case, Battery
	※RJB-19-2	Connector, Battery
	RUP-4990	P.C. Board, Speaker
	※RUL-409	Bracket, Battery Case M'tg.
	※RJT-750-1	Bracket, Whip Antenna
		APPEARANCE
	RYA-4381	Cabinet (complete)
	※RYM-841	Cabinet Front (complete)
	※RYF-721	Cabinet Back Cover (complete)
	XEAR3K82GA	Whip Antenna
	⊕B2-5N	Screw, Whip Antenna M'tg. (2 req'd)
	RBV-141	Knob, Volume
	FC1.-4N	Screw, Volume Knob M'tg.
	※RKH-102	Strap, Cabinet
	※RMX-254	Washer, Strap M'tg.
	RKD-5490	Scale, Dial
	RBT-172	Knob, Tuning

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